

ABSTRACT OF THE DISCLOSURE

A beam source has a plasma generating chamber, an antenna for generating plasma in the plasma generating chamber, a first electrode disposed in the plasma generating chamber, and a second electrode disposed in the plasma generating chamber. Both of the antenna and the second electrode face the first electrode. The beam source also includes a power supply for applying a voltage between the first electrode and the second electrode to extract particles from the plasma generated by the antenna. The beam source applies various kinds of beams having a large diameter, such as a positive ion beam, a negative ion beam, and a neutral particle beam, uniformly to a workpiece.